Department of Energy

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APR 13 2006

DOE-0111-06

Mr. James A. Saric, Remedial Project Manager
United States Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Thomas Schneider, Project Manager
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF THE PROJECT SPECIFIC PLAN FOR THE INSTALLATION OF THE WASTE STORAGE AREA PHASE II MODULE EXTRACTION WELL AND MONITORING WELLS

Enclosed for your review and approval is the Project Specific Plan for the Installation of the Waste Storage Area Phase II Module Extraction Well and Monitoring Wells.

If you have any questions or require additional information, please me at (513) 648-3139.

Sincerely,

Johnny Reising

Johnny W. Reising
Director

Enclosures

cc w/ enclosures:
G. Stegner, DOE-OH
C. Jacobson, Stoller
M. Lutz, Stoller
M. Miller, Stoller
J. Powell, DOE-LM/OH
M. Cullerton, Tetra Tech
M. Murphy, USEPA-V, A-18J
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PROJECT SPECIFIC PLAN
FOR THE INSTALLATION OF THE
WASTE STORAGE AREA PHASE II MODULE
EXTRACTION WELL AND MONITORING WELLS

PROJECT NUMBER 52424-PSP-0005

APRIL 2006

Prepared by

Fluor Fernald

Prepared for

U.S. Department of Energy

Under Contract DE-AC24-01OH20115

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APPENDICES

1.0 INTRODUCTION

This Project Specific Plan (PSP) serves as the controlling document for:

- The installation of Extraction Well 33330 (EW-33) southwest of the former Silo 4 location
- The installation of six (6) Type 8 (Continuous Multi Channel Tubing [CMT]) groundwater-monitoring wells, (83337 thru 83341and 83346), in the former Silos/Waste Storage Area.

Figure 1-1 is a map that shows the locations of the new wells. As illustrated in Figure 1-1, several monitoring wells were recently plugged and abandoned to make way for surface excavation activities. Monitoring Well 2648 will be plugged and abandoned in the near future.

Extraction Well 33330 will be installed using a cable-tool drilling rig. Prior to well installation a rotosonic-drilling rig will be used to collect core at Extraction Well 33330. Aquifer sediment samples will be obtained from the core to aid in the design of the well screen. The Type 8 CMT monitoring wells will be installed using a Geoprobe 6600™ System. All installation and sampling field activities will conform to the guidelines set forth in the Sitewide CERCLA Quality Assurance Manual (SCQ), unless otherwise specified in this PSP. Performance of the requirements specified in procedure ADM-02, *Field Project Prerequisites,* shall precede all field activities.

NOTE: Initial site review of this PSP was completed in August 2005. Final issue of this PSP was delayed till April 2006 to resolve EPA concerns regarding the number and location of extraction and monitoring wells needed in the waste storage area. Site closure schedules necessitated the need to begin work on the installation of Extraction Well 33330 prior to fully resolving EPA concerns. Sediment cores needed to design the well screen were collected on October 28, 2005, and cable tool drilling of the extraction well began on March 30, 2006. Both of these activities were conducted consistent with established site protocols found in earlier drilling PSPs and in this PSP.

Factors affecting a Monitoring Strategy in the WSA

With the exception of manganese, all of the non-uranium groundwater FRL exceedances detected in the Waste Storage area are situated within or very close to the footprint of the uranium plume. As reported in the Waste Storage Area Phase II Design, the footprint of the manganese plume is larger than the footprint of the uranium plume, and some of the manganese FRL exceedances are isolated and much deeper than the uranium plume. Isolated, in that there are no corresponding shallower manganese exceedances in the immediate area as would be expected if the contamination was sourced from above.

As discussed in the Addendum to the Waste Storage Area Phase II Design, manganese appears to be bioaccumulated around a couple of monitoring wells in the Waste Storage Area. Biofouling is a concern for the other wells in the area, and for any future wells that will be installed.

In the Waste Storage Area, the possibility also exists that uranium may be sorbed to aquifer sediments above the current elevation of the water table. If water levels rise in the future, the sorbed uranium present on the aquifer sediments could dissolve into the groundwater increasing plume concentrations. Monitoring flexibility needs to be provided to address possible future water table rises.

The factors presented above have led to the following groundwater monitoring strategy for the Waste Storage Area. A limited number of three channel CMT monitoring wells will be installed to target the uranium plume. The limited number of CMT wells will be supplemented with an ongoing activity of direct-push sampling. The benefit of this strategy is that it will limit the number of fixed monitoring locations that manganese could bioaccumulate around, and provide greater flexibility to monitoring more depths and locations in the aquifer, both within and outside of the footprint of the uranium plume, as the remedy progresses.

Continuous Multichannel Tubing (CMT) wells provide more vertical monitoring flexibility than conventional Type 2 wells do. As discussed below, three-channel CMT wells were selected (rather than seven channel CMT wells) because the uranium plume they are targeting in the Waste Storage Area is not very thick (ranges between 10 to 20 feet).

Location and Basis for Extraction Well 33330

Information supporting the basis and location of Extraction Well 33330 was provided to the U.S. Environmental Protection Agency and the Ohio Environmental Protection Agency on July 12, 2005 in the *Waste Storage Area Phase II Design Report*. In the WSA Phase II Design Report, Extraction Well 33330 is identified as WSA-5.

Location and Basis for Additional Monitoring Wells

The basis for the locations of the additional monitoring wells is as follows:

- Locations 83337, 83338, 83339, and 83346 were selected to monitor remediation progress around the new extraction well (Extraction Well 33330) in the Silo Area
- Location 83340 was selected to monitor at the leading edge of the northeast corner of the uranium plume. Monitoring Well 2648 is targeted for plugging and abandonment. This new CMT well will serve as a replacement.
- Location 83341 was selected to monitor the aquifer down gradient of the deepest portion of former Waste Pit 3.

Direct push groundwater samples used to support the Waste Storage Area Phase I and II Designs were used to define the thickness of the uranium plume near the new monitoring well locations. Figure 1-2 is a cross section taken from the Waste Storage Area Phase II Design. A location map for the cross section is provided in Figure 1-3. The cross section illustrates that the plume is 10 to 20 feet thick in the Silos Area. Five CMT wells (with three channels each) will be installed in this area (Monitoring Wells 83337, 83338, 83339, 83340, and 83346). Three channel CMT wells will provide monitoring over a vertical thickness of 30 feet. This monitoring range will provide full vertical monitoring coverage of the uranium plume (up to 20 feet thick) and an additional higher elevation monitoring point should water levels rise in the future. The top of the uranium plume in the Silos area is positioned at the water table.

Historic water level data from monitoring wells (2032, 2649, 2821, 2648, and 2027) were used to define average water levels for these areas. The top of channel two in each CMT well will be positioned at the average water level elevation of the closest monitoring well as described below.

- The midpoint of channel one at CMT Monitoring Well 83337 will be positioned at an elevation of approximately 522 feet amsl to correspond to the average water table elevation recorded at Monitoring Well 2649. A water level versus time graph is provided in Figure 1-4.

- The midpoint of channel one at CMT Monitoring Well 83338 will be positioned at an elevation of approximately 521 feet amsl to correspond to the average water table elevation recorded at Monitoring Well 2821. A water level versus time graph for Monitoring Well 2821 is provided in Figure 1-5.

- The midpoint of channel one at CMT Monitoring Well 83339 will be positioned at an elevation of approximately 522 feet amsl to correspond to the average water table elevation recorded at Monitoring Well 2032. A water level versus time graph for Monitoring well 2032 is provided in Figure 1-6.

- The midpoint of channel one at CMT Monitoring Well 83346 will be positioned at an elevation of approximately 522 feet amsl to correspond to the average water table elevation recorded at Monitoring Well 2032. A water level versus time graph for Monitoring well 2032 is provided in Figure 1-6.

- The midpoint of channel one at CMT Monitoring Well 83340 will be positioned at an elevation of approximately 521 feet amsl to correspond to the average water table elevation recorded at Monitoring Well 2648. A water level versus time graph for Monitoring Well 2648 is provided in Figure 1-7

- The midpoint of channel one at CMT Monitoring Well 83341 will be positioned at an elevation of approximately 521.4 feet amsl to correspond to the average water table elevation at Monitoring Well 2027. A water level versus time graph for Monitoring Well 2027 is provided in Figure 1-8. The 30 µg/L uranium plume is not present at the location selected for Monitoring Well 83341. A monitoring well was selected for this location because it is just down gradient of the deepest portion of Former Waste Pit 3. A monitoring well at this location will provide data to document that uranium concentrations in the aquifer are not increasing at this strategic location.

2.0 MANAGEMENT AND ORGANIZATION

For the Extraction Well, a qualified subcontractor, under the direct supervision of Fluor Fernald, will conduct drilling activities. Fluor Fernald personnel will fabricate and install the Type 8 Monitoring Wells. Fluor Fernald will perform all sampling activities defined in this PSP. Descriptions of some of the key technical responsibilities of project personnel or organizations are provided below:

The Fluor Fernald Aquifer Restoration/Wastewater Project (ARWWP) Manager is responsible for:

- Providing overall project management and technical guidance
- Ensuring the necessary resources are allocated to the project for the efficient and safe completion of PSP activities
- Overseeing and auditing PSP activities to ensure that the work is being performed efficiently and in accordance with all regulatory requirements and commitments, DOE Orders, site policies and procedures, and safe working practices.

The Fluor Fernald ARWWP Hydrogeology Lead is responsible for:

- The safe and prompt completion of work outlined in the PSP
- Oversight and programmatic direction of sampling activities
- Interpretation of sampling data
- Reporting to the Fluor Fernald ARWWP Manager on the status of PSP activities and on the identification of any problems encountered in the accomplishment of the PSP
- Assisting field personnel as required to complete work described in this PSP
- Assuring that data needed for screen and well design are identified
- Designing the screen for the extraction well

The Fluor Fernald Water Monitoring Manager is responsible for:

- Managing and overseeing the drilling and installation of the wells in the field
- Assigning a Field Geologist to oversee drilling operations
- Oversight of the subcontractor during drilling and installation
- Reporting field progress to the Fluor Fernald ARWWP Hydrogeology Lead.

The key project personnel are listed below:

Title	Primary	Alternate
Fluor Fernald ARWWP Manager	Bill Hertel	
Fluor Fernald ARWWP Hydrogeology Lead	Ken Broberg	Bill Hertel
Water Monitoring Manager	Karen Voisard	
Field Geologist	Jonathan Walters	Karen Voisard
Laboratory Contact	Chuck White	
Quality Assurance Contact	Mike Hoge	Scott Wheeler
Health & Safety Contact	Gregg Johnson	Keith Lanning

3.0 FIELD ACTIVITIES

Field activities will include:

- Staking and surveying the drilling locations (Section 3.1)
- Installation and development of Extraction Well 33330 (Section 3.2)
- Installation, development, and initial sampling of CMT Groundwater Monitoring Wells 83337, 83338, 83339, 83340, 83341 (Section 3.3).

3.1 STAKING AND SURVEYING THE DRILLING LOCATIONS

Exact coordinates for each well location will be surveyed prior to drilling. Estimated coordinates are as follows:

- Monitoring Well 83337: N: 481023.28, E: 1346735.55
- Monitoring Well 83338: N: 481163.08, E: 1347027.33
- Monitoring Well 83339: N: 480752.95, E: 1346820.82
- Monitoring Well 83340: N: 481508.46, E: 1347504.04
- Monitoring Well 83341, N: 481890.85, E: 1347199.93
- Monitoring Well 83346, N: 480693.40, E: 1347084.78
- Extraction Well 33330, N: 480881.87, E: 1346944.68

Estimated coordinates could change to avoid field obstructions and/or final area excavation work. Final well locations will be based on post soil-remediation topography and access limitations. A surveyor's stake with a highly visible ribbon tied around the top will be driven into the ground at each drilling location. The staked location will be surveyed vertically and horizontally to the nearest 0.1 foot and approved by a State of Ohio-licensed surveyor. The corresponding well number for the location will be written on the stake. Survey coordinates will be entered into the Site Environmental Database. Field crews shall conform to the requirements stated in procedure SH-0018, *Penetration Permits*, prior to penetrating the ground surface beyond six inches.

3.2 INSTALLATION AND DEVELOPMENT OF EXTRACTION 33330

The installation strategy for Extraction Well 33330 will be to first collect a four-inch diameter sediment core from an eight-inch boring using a rotosonic drilling rig to support design of the well screen. Select samples of aquifer material taken from the core will be sieved. The grain size results will be used to select the most efficient slot size possible for the screen, and an adequate artificial filter pack sand size. Following the collection of the rotosonic core, a 24-inch diameter borehole will be drilled using a cable tool-drilling rig to facilitate installation of the well.

Activities for the installation and development of the extraction well consist of the following:

- Collection of sediment cores
- Well installation
- Well development

3.2.1 Collection of Sediment Cores

A rotosonic-drilling rig will be used to collect a four-inch diameter sediment core prior to installing Extraction Well 33330 with a cable-tool drilling rig. Soil samples will be collected in accordance with procedure DRL-02, *Solids Sampling in Drilled Boreholes*. A four-inch diameter rotosonic core will be obtained from the target-sampling interval 530 feet amsl to 500 feet amsl. Using an estimated ground surface elevation of 575.4 feet amsl, this target depth interval is approximately 45.4 feet below ground surface to 75.4 feet below ground surface. **A true surface elevation must be measured just prior to the collection of the core to assure that the proper depth interval is collected.**

A Field Geologist shall prepare brief lithologic description of the core on a *Visual Classification of Soils Form (FS-F-3681)*. The lithology of the core will be described. Soil samples (500 ml) will be collected from the core and submitted to a laboratory for particle size analysis via sieves to support the selection of screen slot size, screen length, and filter pack size. The target-sampling interval presented above is based on previous direct-push sampling water quality results conducted in support of the Waste Storage Area Phase II Design.

Following the collection of the sediment core, the rotosonic borehole will be allowed to collapse naturally up to the water table. If available, a cable tool drilling rig will be moved over the boring and drilling of the well bore will begin without abandoning the Rotosonic™ boring. If the cable-tool drilling rig is not available, then the borehole above the water table will be temporarily filled with Global #4 sand or finer up to the glacial till/aquifer interface. From the glacial till/aquifer interface to the surface, the hole will be filled with bentonite chips.

3.2.2 Installation of Extraction Well 33330

Following collection of the sediment core and design of the well screen, a cable tool drilling rig shall be used to advance a 24-inch diameter borehole to a target drilling depth of 75.4 feet below the ground surface (500 feet amsl). The exact drilling depth will be set once the screen has been designed and the length of the screen has been determined. The Field Geologist will document drilling, installation, and development activities on standard *Field Activity and Well Completion Logs (FS-F-3682, 3681-1)*. Well installation shall be performed in accordance with the requirements outlined below and, unless otherwise specified, shall follow the general guidelines set forth in Appendix J of the SCQ.

Extraction Well 33330 will be constructed of 16-inch diameter, 304-stainless steel. It will be capable of delivering a minimum of 100 gallons per minute (gpm) of groundwater with an average screen entrance velocity of < 0.1 feet per second. The extraction well will be installed with a five-foot sump at the base of its screen.

The actual length and depth of the screen interval will be designed after sieve analysis results have been obtained. The Hydrogeology Technical Lead will advise the Field Geologist at what depth to place the top of the well screen. The depth selected for the screen will also consider the dynamic water level, which will be achieved during the aquifer restoration when the entire aquifer system is operating. Criteria, which will be used to determine the length and slot size of the well screen, are as follows:

- The depth and thickness of the > 30 μg/L total uranium plume in the water column
- The lithology and grain size of the aquifer material within the > 30 μg/L total uranium plume
- Model predicted pumping water levels
- Historic measured water levels.

The extraction well will be completed using an artificial filter pack. The artificial filter pack will extend to a height above the well screen a minimum of one-half the length of the well screen. If deemed appropriate, a layer of "transition sand" will be installed above the artificial filter pack sand. This transition sand will have a finer grain size than the artificial filter pack sand surrounding the well screen. The transition sand will have a minimum thickness of five feet and will extend to a height of at least 10 feet above the average recorded water level. A bentonite seal (pellets or chips) (minimum of five feet) will be installed above the transition sand. The objective will be to place the bentonite plug in the aquifer sand at least 10 feet above the average-recorded water level or across the glacial overburden/sand interface. No bentonite pellets/chips will be installed below the water table. A backfill of grout slurry above the bentonite seal shall extend to the ground surface. Specific dimensions for the annular seal will be provided once the sieve results from the core have been obtained and the length of the screen has been finalized.

The well riser shall terminate approximately two feet above the ground surface. The well will be secured with a well cap. During installation of the well, the Field Geologist will be responsible for documenting that the correct thickness of annular fill material is being installed, and that the well screen is installed at the correct depth. Frequent measurements of the depth to the top of the annular fill need to be collected to verify the installation process. If installation work is interrupted (i.e., break for lunch, carry over to the next day, etc.) the Field Geologist will verify that the depths measured prior to the installation interruption are the same depths measured prior to resuming installation activities after the interruption.

3.2.3 Development of Extraction Well

Well development shall be performed as outlined below. Well development shall be initiated no sooner than 48 hours following completion of well installation.

Development will be conducted with the same protocols used to develop previously installed extraction wells. This development strategy has proven to be successful. Development will begin by surging the well. After the well screen has been designed, the ARWWP Hydrogeology Technical Lead will determine a surging plan for the screen, based on the stroke length of the development rig being used and the length of the well screen. The stroke length of the development rig determines the length or interval of screen that is surged by the surge block during a particular event. For the purpose of this PSP, this screen length will be called the "surge interval". The sand contained in the well will be measured and removed periodically at the field geologist's discretion. The field geologist will be responsible for assuring that sand does not accumulate in the well and impede the surging process. Surging will begin slowly and gradually increase (i.e., operate the rig slowly then gradually increase power or stroke length if possible).

Following surging, the well will be pumped for six-hours for the purpose of measuring the sand content of the pumped water and the specific capacity of the well. The goal of development will be to produce a well capable of delivering water that has a sand content of 10 parts per million (ppm) or less. If the sand content of the pumped groundwater is below 10 ppm at the conclusion of the development pumping, then development is complete. If the sand content of the pumped groundwater is above 10 ppm at the end of the development pumping, then the development cycle shall be repeated until the ARWWP Hydrogeology Technical Lead determines that development is complete.

3.2.3.1 Project-Specific Requirements for Extraction Well Development

1. Measure the depth to the bottom of the well. Record the depth in the comment section of the *Well Development Form.*

2. Lower the surge block to the lower surge interval of the well screen and surge the well for one hour.

3. Measure down to the bottom of the well periodically to record how much sediment was brought into the well as a result of the surging.

4. Bail or air lift as much sediment from the well as possible. Measure the total depth of the well to document how much sand was removed.

5. Raise the surge block to the next higher surge interval of the screen and surge for one hour.

6. Repeat Steps 3 through 5 until the top surge interval of the screen has been surged.

7. After surging the top surge interval of the screen, repeat Steps 3 through 6, but lower the surge block after each hour of surging instead of raising it. Shorter surge time intervals can be used if deemed appropriate.

8. Upon reaching the lower surge interval of the screen, repeat Steps 3 through 6 again. Follow this procedure of surging up and down the screen for a maximum of 24 hours, unless the technical lead determines that the well has reached an acceptable development state sooner than 24 hours.

3.2.3.2 <u>Performance Testing</u>

Testing will be performed as follows:

1. Measure the total depth and the static water level of the well and record the information on the *Field Activity Log (FS-F-3680)*.

2. Pump the well for two hours at 200 gpm. Measure the water level of the pumping well approximately every 20 minutes. Collect a total uranium sample at the end of each two-hour pumping interval.

3. Conduct a sand content test every 20 minutes. Steps for conducting a sand content test are provided below.

4. After two hours of pumping calculate a specific capacity, increase the pumping rate to 400. Pump the well for an additional two hours and repeat the measurements described in Steps 2 and 3 and calculate another specific capacity.

5. Increase the pumping rate to 600 gpm. Pump the well at this rate for an additional two hours and repeat the measurements described in Steps 2 and 3 and calculate a specific capacity.

6. After a total of approximately six hours of pumping, stop the pumping.

7. Measure the recovery rate of the well by taking water level measurements every 30 seconds until the water level is to within one foot of the static water level recorded before the start of pumping approximately six hours earlier.

3.2.3.3 Sand Content Testing

Sand content will be measured by passing a sample of the pumped well water through a centrifugal sand sampler. The centrifugal sand sampler will be installed in the discharge line used for development, just slightly down gradient of the wellhead. Operation of the sand content sampler is described as follows:

1. Install the centrifugal sand content tester as directed by the manufacturer. The inlet should be located on the horizontal centerline of the discharge pipe and as close to the discharge head as possible.

2. Open the tester inlet valve wide open. Adjust the outlet valve to one-half gpm. (This will fill one quart in 30 seconds or one gallon in two minutes).

3. Close the inlet valve, remove, clean, and replace the glass tube.

4. When ready to start the sand content test, record the start time and open the inlet valve wide open.

5. After five minutes, record the amount of accumulated sand in the glass tube. Calculate the sand rate by dividing the amount of accumulated sand by five minutes (the amount of time to accumulate the sand).

6. Periodically check the flow rate through the tester during each run. If the flow rate is not one half gpm, then repeat the test.

7. Calculate the rate of sand production per unit of water according to the following calculation:

$$\frac{[\text{sand rate (ml/min)}]}{[0.5 \text{ gpm} \times 231 \text{ in}^3\text{/gallon} \times 16.387 \text{ ml/in}^3]*1E6} = \text{ppm}$$

3.2.3.4 Chlorination of Developed Well

Following development, the extraction well will be chlorinated using a mixture of water and sodium hypochlorite .

The site drilling contractor, under the direction of Fluor personnel, will prepare a chlorination solution of water and sodium hypochlorite in a holding tank(s). The final treatment volume will be equal to the volume of water in the well multiplied by three (3). The objective is to have a chlorination solution with a chlorine concentration of 200 mg/L. The criterion for reaching this concentration is to use 1 gallon of sodium hypochlorite for every 500 gallons of treatment volume.

After determining the treatment volume for the well (three times the volume of water in the well) divide the treatment volume by 500 to determine how many gallons of sodium hypochlorite to add to the solution. The starting volume of water for the mixture will equal the treatment volume minus the volume of sodium hypochlorite to be added to the mixture.

Mixing the chlorination solution will begin by adding the starting volume of potable or treated water to the tank. To the starting volume of water, add the sodium hypochlorite. Blend the chlorination solution in the holding tank by re-circulating the mixture. A hose lead from the base of the tank to the top, and a small pump will re-circulate the solution. Re-circulate the solution until approximately two volume turnovers have been achieved. Following blending, the pump used to blend the solution will be flushed with 5 gallons of water.

Gravity Feed the Chlorination Solution into the well

The site-drilling contractor will gravity feed the chlorination solution into the well just below the top of the water table.

Surging the chlorination solution in the well

The site-drilling contractor will surge the chlorination solution in the well with a tight fitting surge block. Surge the well for 15 minutes at 2.5-foot intervals.

The well will be allowed to sit overnight, or for a minimum of 6-hours if overnight is not possible. The chlorination solution should not be allowed to remain in the well for more than 24 hours.

Pumping the spent chlorination solution from the well

DANGER: SODIUM THIOSULFATE SHOULD NEVER BE MIXED DIRECTLY WITH ANY OTHER PURE CHEMICAL

The following day, the site drilling contractor will surge the well again briefly (5 minutes at each 2.5 foot interval of screen and sump).

The site-drilling contractor will then pull the surge block from the well and install a pump capable of pumping 200 gpm or more.

An enclosed hookup from the well to the tank will be provided. An enclosed hook up is one that is isolated from the environment so that the probability of an accidental release is reduced.

The well will be pumped vigorously to remove as much spent chlorine and dead bacteria as possible. The volume to be removed will equal five (5) times the treatment volume used. A meter will be used to measure and track the pumping rate.

Start pumping as low in the well as possible given the pump being used. A meter and totalizer will be used to measure and record the pumping rate and volume.

The water will be pumped to a tanker truck. Water monitoring personnel will measure the chlorine concentration of the water in the tanker for disposal purposes. A colorimeter may be used. Chemicals may be added to the treated groundwater for disposal purposes. Sodium thiosulfate shall be used to de-chlorinate groundwater treated with sodium hypochlorite. The sodium thiosulfate shall be placed in the tanker or an empty discharge hose, via a chemical port, to contact treated ground water.

Any chlorinated wastewater must be accompanied by a measurement of residual chlorine. Residual chlorine should be no greater than 0.1 mg/L.

3.3 DRILLING AND INSTALLATION OF WELLS 83337, 83338, 83339, 83340, 83341 AND 83346

Six, three-channel, Type 8 CMT wells will be installed in the Waste Storage Area (Monitoring Well 83337 through Monitoring Well 83341 and 83346). Figure 1-1 illustrates the locations of the six monitoring wells. The uranium plume in the area of Well 83337 thru 83340 and 83346 is 10 to 20 feet thick. No uranium plume is present at Location 83341. Three channel CMT wells are being installed to provide monitoring over a vertical thickness of 30 feet. This monitoring range will provide full vertical monitoring coverage of the uranium plume (up to 20 feet thick) and an additional higher elevation monitoring point should water levels rise in the future. The top of the uranium plume in the Silos area is positioned at the water table.

The CMT Wells being installed consist of tubing that is divided into three separate channels. Each channel will be screened at a different depth in the aquifer. The channels will be sampled using polyethylene tubing with check valves, connected to a Waterra® pump.

The CMT Multilevel System Model 403 uses 1.1 inch outside diameter polyethylene, continuous three channel tubing. Figure 3-1 is a diagram of a CMT well. Before the system is lowered into the casing, Water Monitoring personnel will construct the CMT

The top and bottom of the screen intervals in each sampling channel are based on historical groundwater level data in the area of the plume and uranium plume thickness. Preliminary well construction designs for the wells are provided in Appendix A.

Prior to any work, the CMT will be visually inspected for damage that may have occurred during manufacturing or shipping. Each channel will be pressure tested to check for leaks after construction. Starting at the bottom, each CMT screen interval will be measured. Depths of each component for each of the channels in each respective well are provided in Appendix A. Drill holes will be measured within each channel's monitoring zone using the CMT installation template. Three, 3/8-inch holes or 1/4 inch holes at 3/4-inch apart will be drilled in each 6-inch subinterval of the monitoring zone. The holes will be drilled with a standard drill using a drill stop to prevent drilling too deep. A 6-inch long, 0.010-inch mesh stainless steel screen will be wrapped around the drilled subsection of the CMT, one around each three holes. Individual subsections of screen are limited to 6 inches in length to avoid screen buckling during installation. The screens will be secured to the CMT by stepless, low profile stainless steel clamps.

At 2.5 feet below each individual outer channel-monitoring zone, a notch will be cut, and the individual channel will be plugged by inserting a mechanically expandable plug into the channel.

A Geoprobe® 6600 Series with 3.25 inch outside diameter casing and expendable point at the end of the tool string will be used to drill the borehole into which the CMT will be installed. If refusal or resistance occurs, then the borehole may be augured or pre-probed through the glacial overburden and upper unsaturated portion of the aquifer. The casing will be pushed to approximately 5 feet below the desired bottom depth for each well then a sufficient quantity of de-ionized water will be added to the casing to prevent heaving sands. The prepared CMT will be lowered into the casing. As the casing is removed, the formation will be allowed to collapse. Once collapse stops, normally at the top of the water table, Global #7 or finer sand will be gravity placed to approximately 2.5 feet below the aquifer/overburden interface. There, a bentonite pellet plug of at least 5 feet in length will be placed and hydrated for approximately one hour before injecting grout slurry to 3 feet below the surface. The grout will be allowed to settle for 24 hours. Additional grout will be added if any settling occurs in the first grout placement. A protective cover and concrete pad will be installed as specified in Appendix J of the SCQ.

3.4.1 Developing the CMT Monitoring Wells

CMT wells will be allowed to sit for at least 48 hours after installation before development begins. Field personnel will follow DRL-03 Monitoring and CMT Well Development. A Waterra® pump equipped with polyethylene tubing with a bottom check/valve will be used to pump each of the channels. For each channel, a minimum of five channel volumes of water will be removed plus the volume of water used during drilling. Since Channel 1 is being set above the water table it will not be possible to develop Channel 1 at the time of installation. Channel 1 will be developed at a later date should water level rise to the Channel 1 elevation. In addition, if water is added during installation, then a minimum of at least the volume of water added during drilling will be removed. The minimum volume removed will be divided evenly between water bearing channels.

The Waterra® pump has a surge stroke of 4 inches; therefore, each CMT channel will be pumped/surged in 4-inch intervals starting at the top of the screen (for interval C2, start the surge at the top of the water table). Due to friction in deeper channels that may cause the sample tubing to kink, the screened section of Channel three may be surged by hand instead of using the Waterra®. A *Monitoring Development/Redevelopment Form* will be completed for each CMT interval.

As development of each channel in each CMT well is completed a groundwater sample and duplicate will be collected and analyzed for total uranium.

3.4.2 Sampling of the CMT Monitoring Wells

Post development sampling will be completed after three tubing volumes of groundwater are purged from each sampling channel. Each channel will be purged using the Waterra® pump equipped with a dedicated polyethylene tube and tubing bottom check valve. The tubing bottom check valve will be placed near the water table of each interval for purging and sample collection to ensure that the samples collected are representative. Temperature, specific conductivity, turbidity, and pH will be measured after each channel volume per procedure EQT-02, *Horiba Water Quality Meter*.

If the sample's turbidity is greater than 5 NTUs, then the sample will be filtered using a 5-micron filter. If the turbidity of the 5 micron filtered sample is still greater than 5 NTUs, then the 5 micron filtered sample will be additionally filtered using a 0.45-micron filter. Both the unfiltered and the final filtered total uranium sample will be analyzed at the on-site laboratory if available, otherwise samples will be sent offsite for analysis Samples will be placed in a 250-mL plastic bottle treated with nitric acid per procedure SMPL-02, *Liquids and Sludge Sampling*, Data Quality Objective (DQO) GW-30.

After an initial test-sampling period, the CMT wells will be added to routine IEMP sampling. Long-term sampling plans for these wells include only total uranium and semi-annual WSA parameters, with the exception of VOAs.

4.0 EQUIPMENT DECONTAMINATION

If drilling and sampling equipment are being moved from a FEMP controlled area, the equipment shall be decontaminated to Level I, using a pressure washer to remove visible materials, prior to transport to the drilling location. Decontamination of the drilling equipment will not be necessary if the equipment has been used previously in a FEMP uncontrolled area. Upon completion of drilling and sampling activities, decontamination of tools and equipment shall be performed to fulfill the Level I specification of the SCQ (reference Section K).

5.0 WASTE DISPOSAL

The disposal of drill cuttings will be coordinated with and approved by the Manager of the Waste Acceptance Organization. Options include spreading the drill cuttings out on the ground surface at the drilling site, or transporting the cuttings to a holding area for later disposal into the on-site disposal facility. Final directions for the disposal of the cuttings will be issued prior the commencement of drilling activities for the installation of the well.

Discharged pumping water (generated during well development) will be sent to the Converted Advanced Wastewater Treatment (CAWWT) facility. Temporary discharge lines will be utilized to connect each drilling location to discharge flowpaths. When temporary lines are used, efforts will be made to minimize road crossings, etc., by threading the temporary lines through existing trenches, and culverts. Field personnel will work closely with Wastewater Treatment Operations personnel to assure that they are aware of the temporary lines and the schedule for the line's use.

The Field Geologist will be responsible for assuring that proper coordination with the Wastewater Treatment Operations personnel has been achieved prior to the discharge of any water into the CAWWT. The Field Geologist will call the CAWWT Supervisor a day prior to beginning development pumping. The Field Geologist will also call the CAWWT Supervisor just prior to pumping to assure that coordination is complete and discharge can begin at an agreed to time. The Field Geologist is also responsible for obtaining the Wastewater Discharge Permit.

6.0 HEALTH & SAFETY

Water Monitoring personnel and project subcontractor personnel shall conform to precautionary surveys performed by the personnel representing the Utility Engineer, Industrial Hygiene, and Radiological Control. Concurrence with applicable safety permits (indicated by the signature of personnel assigned to this project) is expected from all project personnel in the performance of their assigned duties.

The Water Monitoring Manager will ensure that all monitoring and subcontractor personnel performing project related activities have read or been briefed on all applicable safety documents and surveys that protect worker safety and health. Signing the documents is an acknowledgment of reading and understanding it. It is a requirement for all personnel involved in the drilling and sampling activities associated with the well installation. A copy of applicable safety permits/surveys issued for worker safety and health shall be available for reference/review at each sample location. At the completion of the project, the completed forms shall be submitted for incorporation into the project files.

7.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Well installation and development work follows Quality Assurance/Quality Control (QA/QC) protocol.

7.1 PROJECT REQUIREMENTS FOR SURVEILLANCE

Self-assessment of work processes and operations may be undertaken to assure quality of performance. Self-assessments may be performed as directed by the ARWWP Manager, or ARWWP Hydrogeology Lead identified in Section 2.0 of this PSP, and shall encompass technical and procedure requirements. Such self-assessment may be conducted at any point in the project.

Independent assessment may be performed by the Fluor Fernald QA organization by conducting a surveillance. At a minimum the surveillance will consist of monitoring/observing ongoing project activity and work areas to verify conformance to specified requirements. Surveillances shall be planned and documented in accordance with Section 12.3 of the SCQ.

7.2 CHANGES TO THE PROJECT SPECIFIC PLAN

Prior to the implementation of changes, the ARWWP Manager and/or ARWWP Hydrogeology Technical Lead shall be informed of the proposed field changes. Once approval has been obtained from the ARWWP Manager and/or ARWWP Hydrogeology Technical Lead and QA representative for the changes to the PSP, the field changes may be implemented. Variances shall be processed per Section 15.3 of the SCQ.

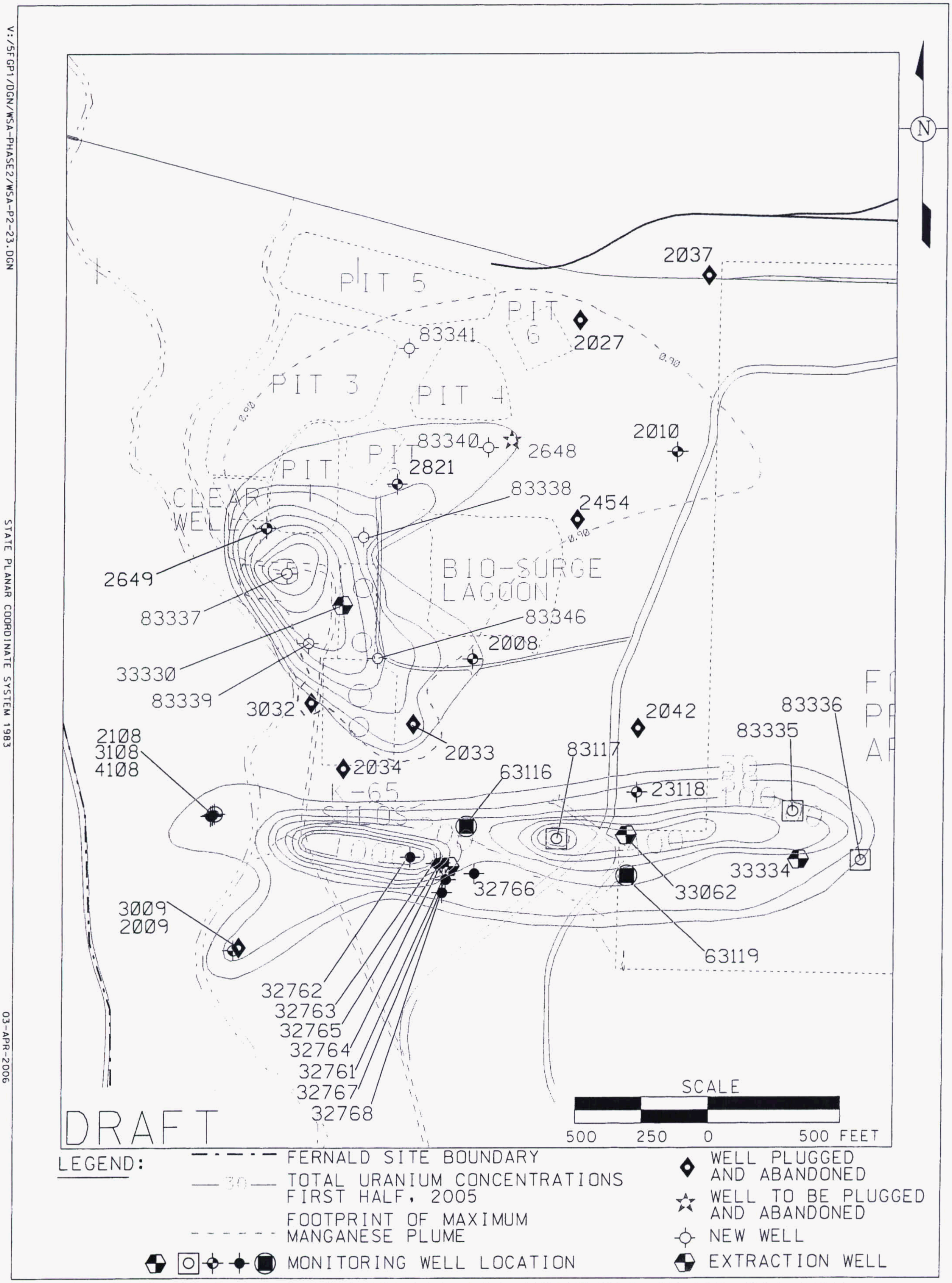
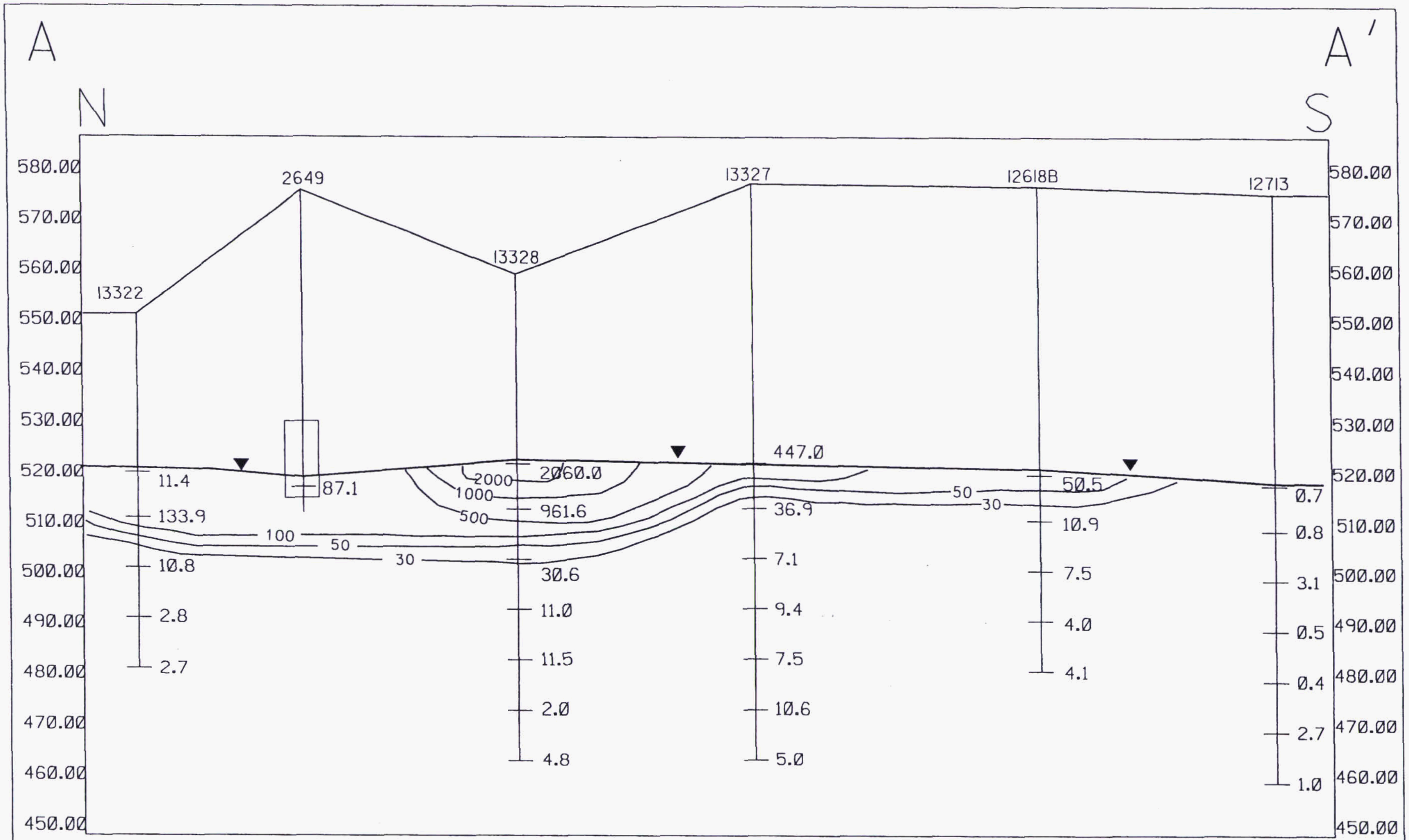


FIGURE 1.1. MONITORING WELL LOCATIONS IN THE WSA AREA



LEGEND:

1.5	TOTAL URANIUM IN GROUNDWATER μg/L
12713	SAMPLED 3-13-2000
2649	SAMPLED 1-10-2005

DRAFT

e:*5crw2*dgn*KEN_B*ken00166.dgn
STATE PLANAR COORDINATE SYSTEM 1983

10-AUG-2005

FIGURE 1-2. WASTE STORAGE AREA, PHASE II CROSS SECTION A - A'

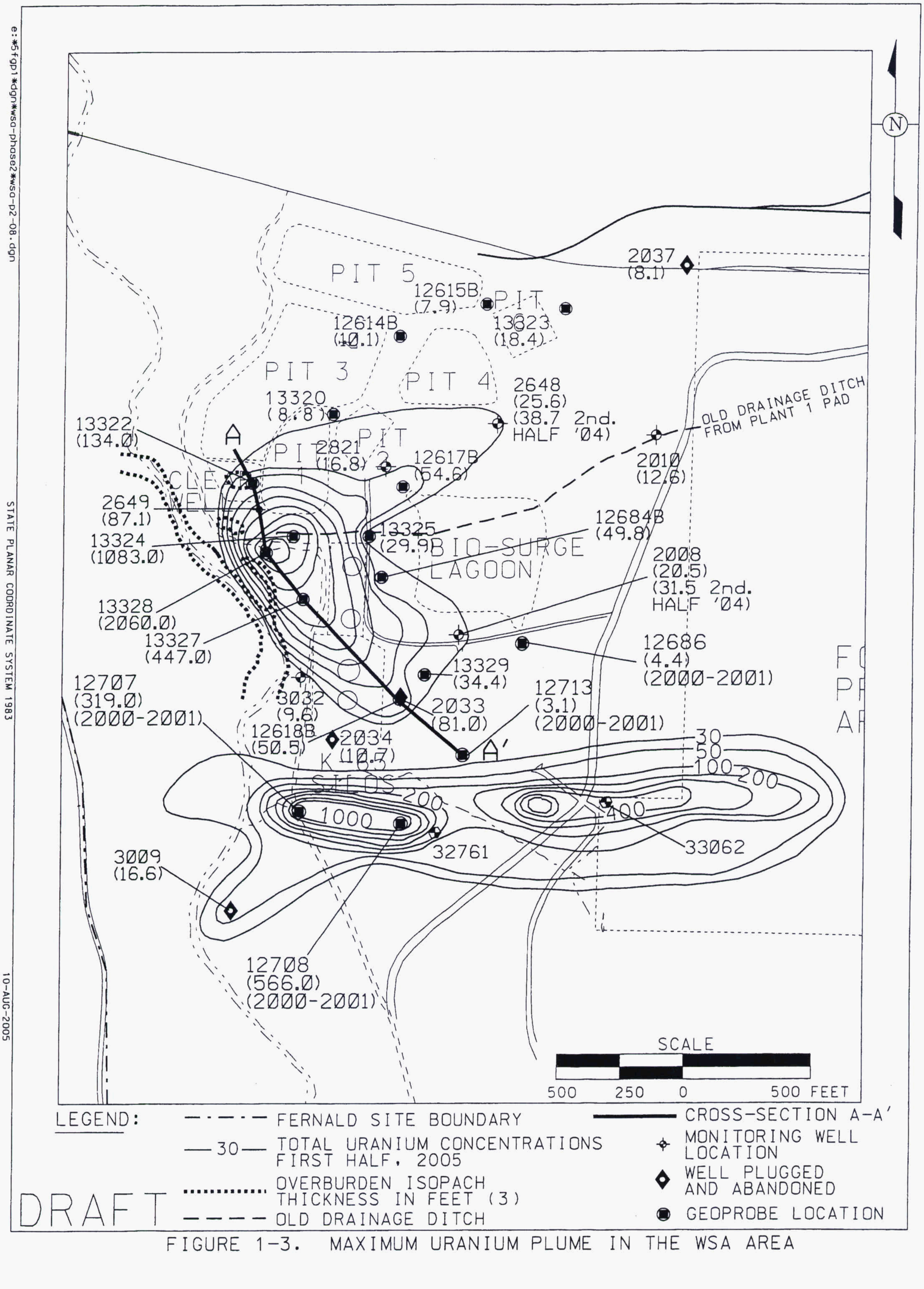


FIGURE 1-3. MAXIMUM URANIUM PLUME IN THE WSA AREA

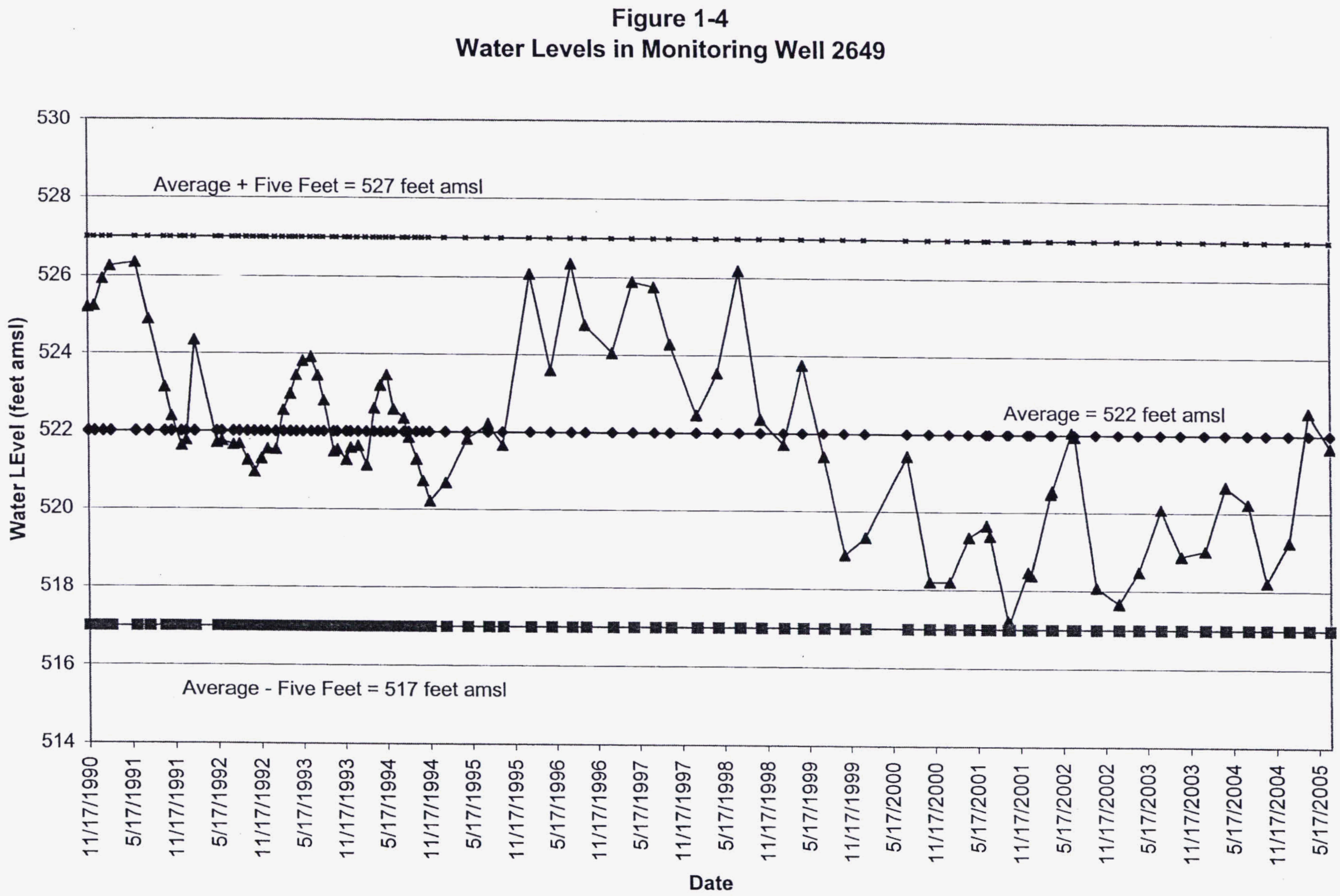


Figure 1-4
Water Levels in Monitoring Well 2649
Average + Five Feet = 527 feet amsl
Average = 522 feet amsl
Average - Five Feet = 517 feet amsl
Water LEvel (feet amsl)
530
528
526
524
522
520
518
516
514
11/17/1990
5/17/1991
11/17/1991
5/17/1992
11/17/1992
5/17/1993
11/17/1993
5/17/1994
11/17/1994
5/17/1995
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5/17/2003
11/17/2003
5/17/2004
11/17/2004
5/17/2005
Date

Figure 1-5
Water Levels in Monitoring Well 2821

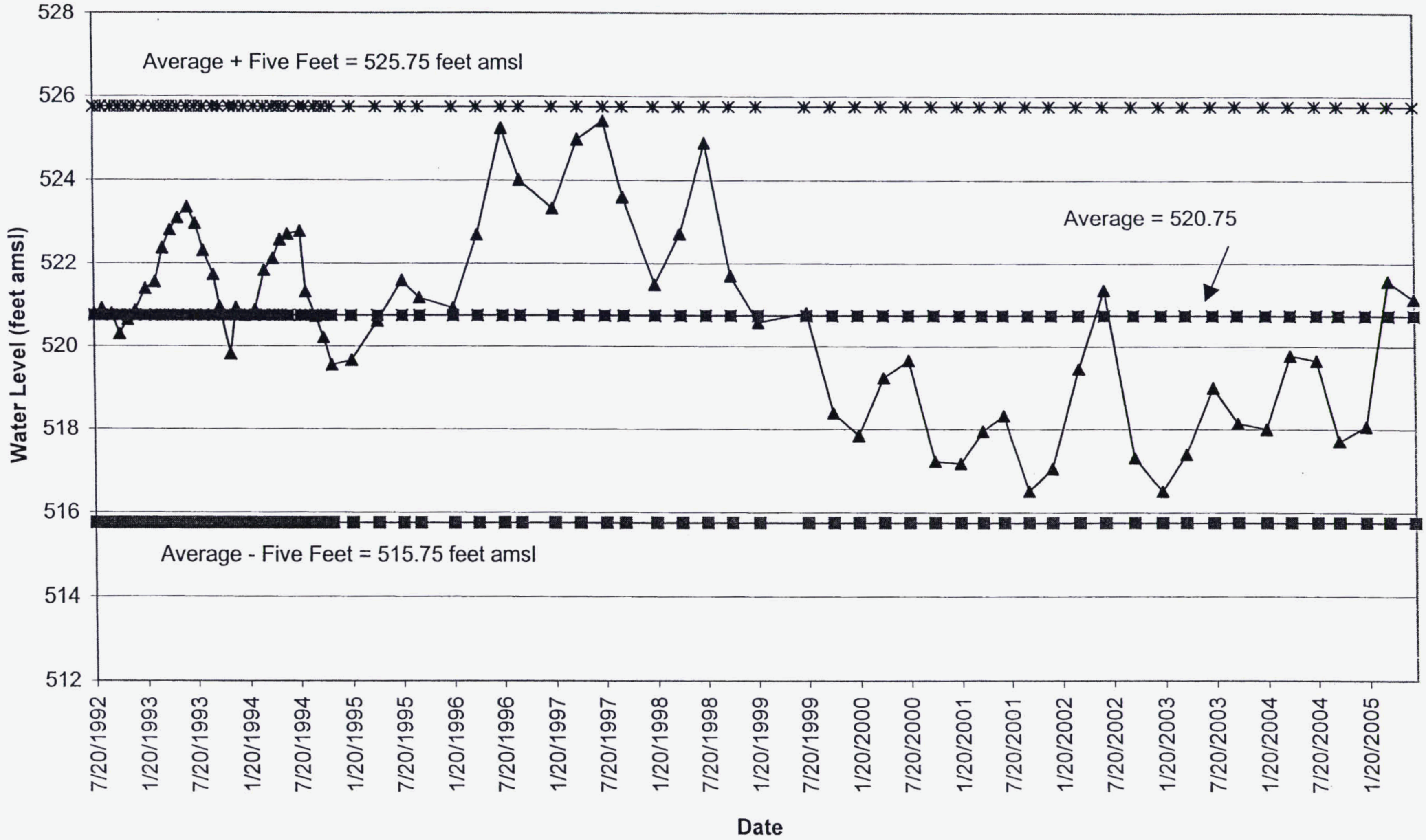


Figure 1-6
Water Levels in Monitoring Well 2032

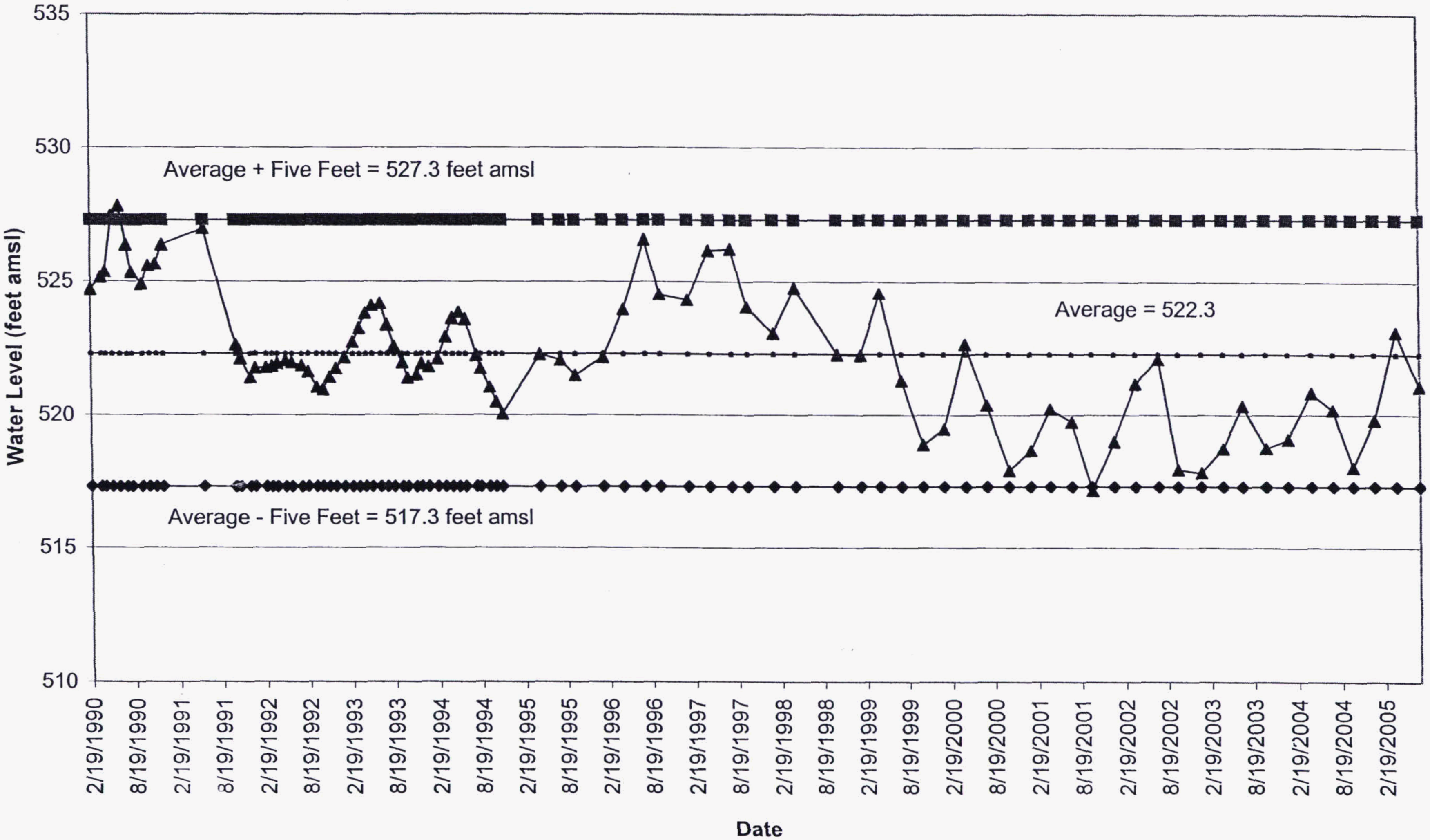


Figure 1-7
Water Levels in Monitoring Well 2648

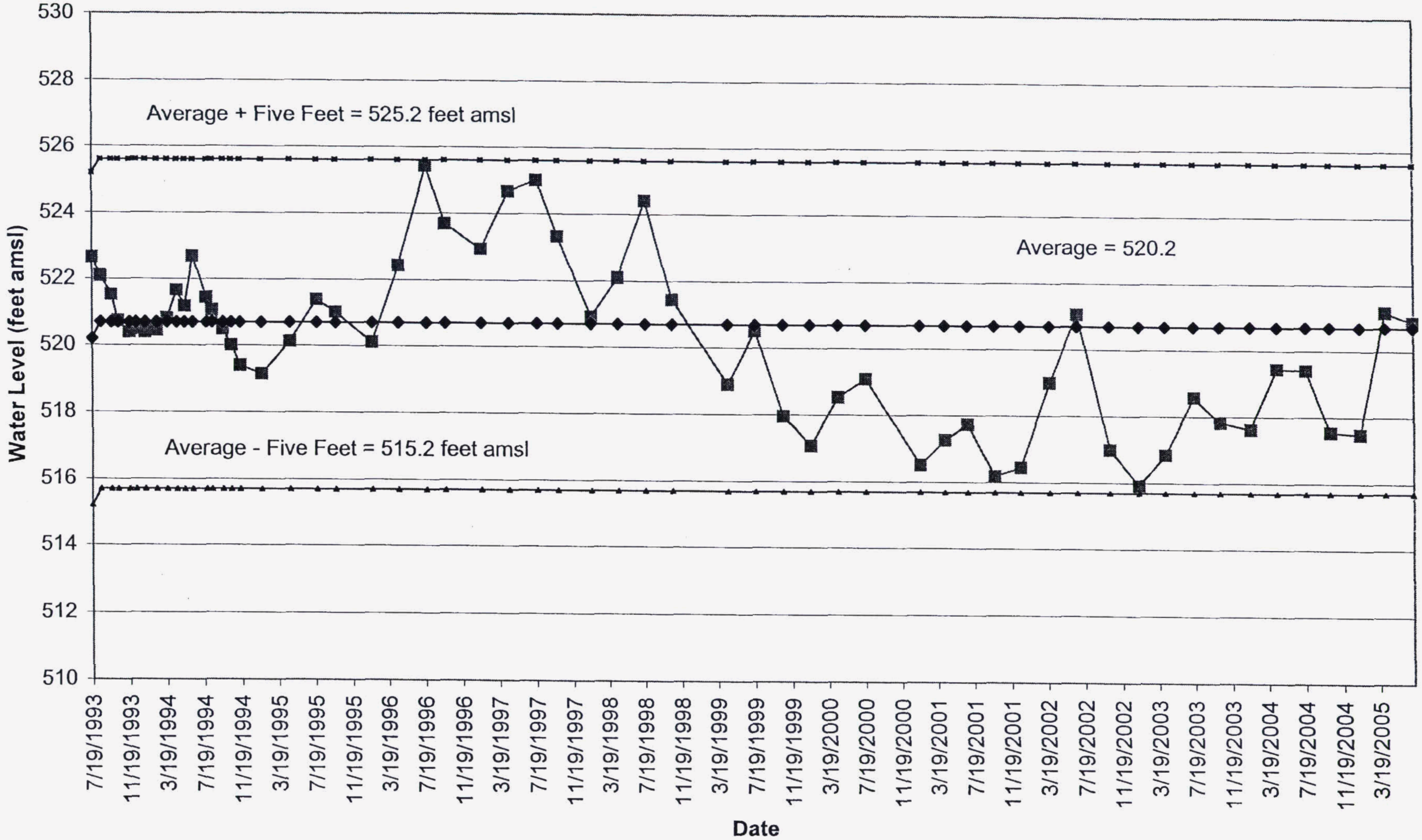
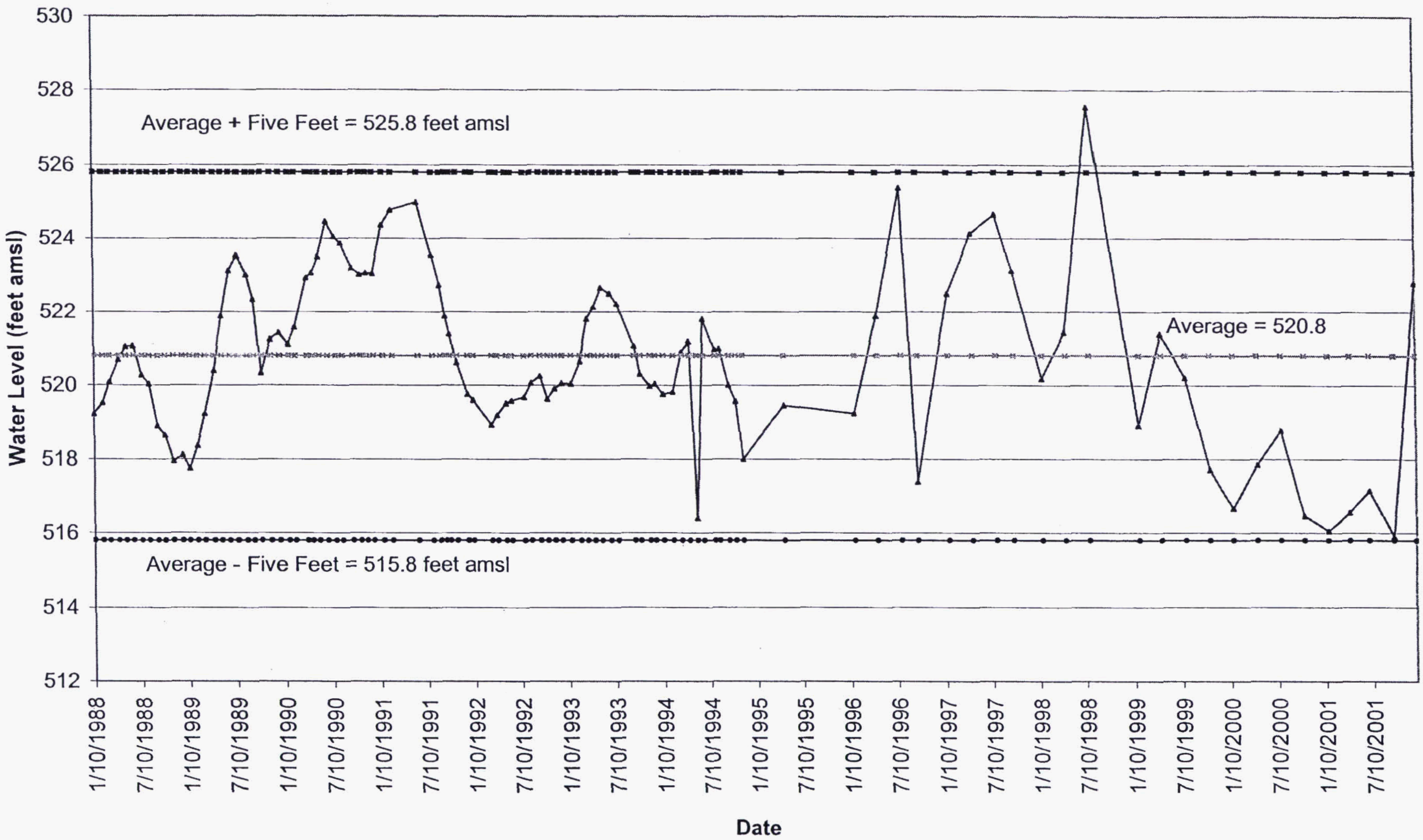


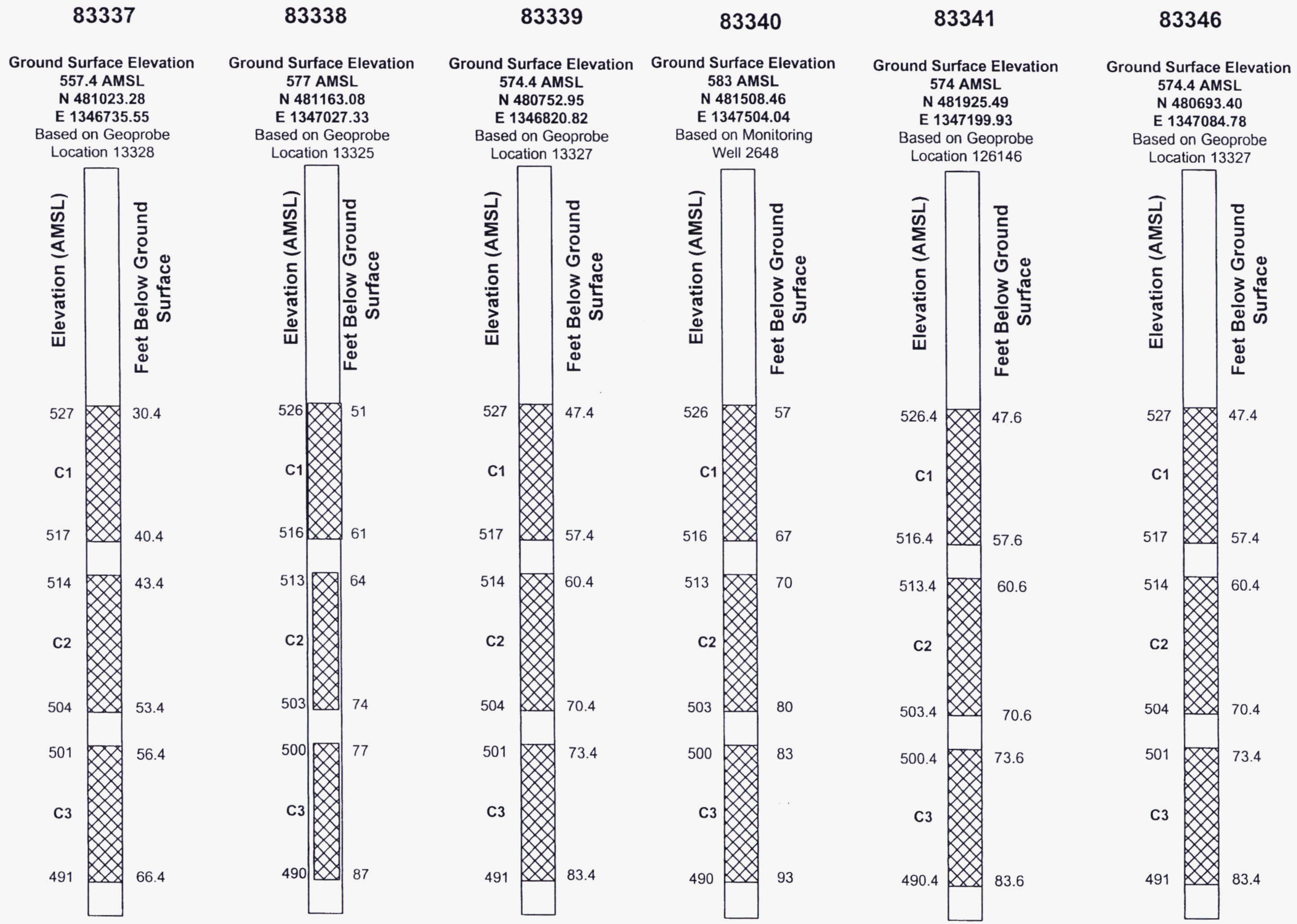
Figure 1-8
Water Levels in Monitoring Well 2027



APPENDIX A

DIAGRAM OF WASTE STORAGE AREA MULTILEVEL WELLS

DIAGRAM OF WASTE STORAGE AREA MULTILEVEL WELLS



Note: Elevations and coordinates are estimates.
Actual depths and locations of well will be adjusted
according to field conditions

Fluor Fernald, Inc.
P.O. Box 538704
Cincinnati, OH 45253-8704

FLUOR

April 13, 2006

Fernald Closure Project
Letter No. C:CPD:2006-0074

Mr. Johnny W. Reising, Director
U. S. Department of Energy
Ohio Field Office – Fernald Closure Project
175 Tri-County Parkway
Cincinnati, Ohio 45246

Dear Mr. Reising:

CONTRACT DE-AC24-01OH20115, TRANSMITTAL OF THE PROJECT SPECIFIC PLAN FOR THE INSTALLATION OF THE WASTE STORAGE AREA PHASE II MODULE EXTRACTION WELL AND MONITORING WELLS

This letter serves to transmit the Project Specific Plan for the Installation of the Waste Storage Area Phase II Module Extraction Well and Monitoring Wells for review and subsequent transmittal to the United States and Ohio Environmental Protection Agencies.

If you have any questions or comments pertaining to this letter, please contact Jyh-Dong Chiou at 738-2834 or Bill Hertel at 648-3894.

Sincerely,

C. M. Murphy

Cornelius M. Murphy
Closure Project Director

CMM:BH:KB:ldt

Enclosure

c: With Enclosure
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Rich Abitz, MS88
Ken Broberg, MS12
JD Chiou, MS88
Bill Hertel, MS12
Frank Johnston, MS12
Timothy L. Jones, DOE Contracting Officer, DOE/EMCBC
Ed Skintik, DOE-OH
Cindy Tabor, MS12
Tammy Terry, MS1
Karen Voisard, MS12
DOE Records Center
File Record Subject – Waste Storage Area Phase II
Letter Log Copy, MS1
Project Number 52424.2.22
Administrative Record, (2 copies) MS6

Without Enclosure
John S. Brown, DOE-OH/ECMBC
Christina Carr, DOE-OH/FCP, MS2
Dennis Sizemore, Fluor Fernald, Inc. Prime Contract, MS1